EXECUTIVE SUMMARY

This is the Executive Summary of the annual Report to the Legislature by the Groundwater Coordinating Council (GCC) as required by s. 15.347, Wisconsin Statutes. The report describes the condition and management of the groundwater resource and summarizes the GCC's activities for fiscal year (FY) 2006. The full report along with several appendices can be accessed online at *http://dnr.wi.gov/org/water/dwg/gcc/rtl/gccreport.htm*.

In 1984, the Legislature enacted 1983 Wisconsin Act 410 to improve the management of the state's groundwater. The GCC is directed by s. 160.50, Wis. Stats., to "serve as a means of increasing the efficiency and facilitating the effective functioning of state agencies in activities related to groundwater management. The Groundwater Coordinating Council shall advise and assist state agencies in the coordination of non-regulatory programs and the exchange of information related to groundwater, including, but not limited to, agency budgets for groundwater programs, groundwater monitoring, data management, public information and education, laboratory analysis and facilities, research activities and the appropriation and allocation of state funds for research."

Membership of the GCC includes the Secretaries of the Departments of Natural Resources (DNR); Commerce; Agriculture, Trade and Consumer Protection (DATCP); Health and Family Services (DHFS); Transportation (DOT); the President of the University of Wisconsin System (UWS); the State Geologist; and a representative of the Governor. Agency designees are listed on the inside of the front cover. More information about the GCC and its activities can be found on the GCC web pages: (*http://dnr.wi.gov/org/water/dwg/gcc/index.htm*).

Highlights from each of the major parts of the Report are summarized below.

GROUNDWATER COORDINATION

The GCC, its Subcommittees, and member agencies worked together to address groundwater management issues and coordinate groundwater activities in FY 06. Examples include:

1. *Implementation of the Groundwater Protection Act, 2003 Wisconsin Act 310.* The Groundwater Advisory Committee (GAC), required by Act 310, met regularly throughout 2006 and made significant progress on groundwater management area and other issues. The GCC and its subcommittees shared technical information and advice with the GAC.

2. *The fourth annual Groundwater Festival was held in Manitowoc on April 27, 2006.* The event was organized by staff at the Center for Watershed Science and Education *(*CWSE), Groundwater Guardians, and local land conservation departments. Volunteers from many state agencies, local colleges and high schools helped lead hands-on groundwater activities to over 600 5th and 6th graders from Brown, Calumet, Kewaunee, Manitowoc and Door counties.

3. *Groundwater: Wisconsin's Buried Treasure* and the *Groundwater Study Guide*, both very popular DNR publications, were revised, printed and distributed in FY 06. Other informational or educational publications that were recently updated to include new information were *Arsenic in Drinking Water, Nitrate in Drinking Water, Iron Bacteria Problems in Wells,* and *Karst: Avoid that Sinking Feeling.*

4. *For the sixth year in a row, three groundwater workshops for teachers were taught jointly by staff from the DNR, WGNHS and CWSE at UW Stevens Point.* The workshop leaders instructed teachers on using a groundwater sand tank model and provided additional resources to incorporate groundwater concepts into their classroom. Teachers from 21 different schools attended the workshops and received a free model for their school. With funding from an EPA grant, 141 groundwater models have been given to schools since 2001.

5. *The GCC and the UWS Groundwater Research Advisory Council (GRAC) continued coordination of the annual solicitation for groundwater research and monitoring proposals among state agencies*. The GCC approved the FY 07 solicitation for groundwater research and monitoring proposals, which was sent out in September 2005 (see *Appendix D*). A total of 12 project proposals were received. A comprehensive review process resulted in the selection of 10 new projects for funding for FY 07, five by UWS and five by the DNR. The GCC unanimously approved the proposed UWS groundwater research plan as required by s. 160.50(1m), Wis. Stats. The FY 07 groundwater monitoring and research projects are listed by funding agency in Table 2, including projects that were carried over from FY 06.

SUMMARY OF AGENCY GROUNDWATER ACTIVITIES

State agencies and the University of Wisconsin System addressed a number of issues related to groundwater protection and management and implementation of Chapter 160, *Wis. Stats.* in FY 06:

1. *Groundwater Protection Act Implementation* – The Groundwater Protection Act (2003 Act 310) expanded DNR's authority to consider environmental impacts on critical surface water resources when considering approval of high-capacity well applications. Notification and fees for all new wells, and annual water use reporting for high capacity wells are also now required. Further provisions include designation of two Groundwater Management Areas to address regional groundwater quantity issues and the creation of a Groundwater Advisory Committee to recommend management approaches in these areas and evaluate the need for further statutory changes. In FY 06 DNR secured funding for and hired five staff to implement the new law. FY 06 accomplishments include:
   - Implementation of an automated Internet well construction notification and fee collection system as well as an internal DNR approval application tracking system.
   - Assessment of the availability of data and evaluation tools needed for evaluating potential significant adverse impacts of high-capacity wells on protected surface waters.
   - Coordination of three inventory, monitoring, and research projects on springs and one project measuring baseflows on small protected streams.
   - Support for the Groundwater Advisory Committee (GAC) and Subcommittee meetings. The GAC meetings occurred every two months.

2. *Continued Remediation and Redevelopment of Contaminated Properties*
   - The DNR approved 512 cleanups of contaminated properties raising the total of approved cleanups (excluding spills and abandoned container responses) to more than 13,700. More than 95 percent of the cleanups undertaken by responsible parties proceeded without enforcement.
   - DNR awarded 50 Site Assessment Grants totaling approximately $1.7 million to 33 communities across the state. The grants will provide funds for site assessments and

investigations, the demolition buildings or structures and the removal of tanks, drums and other abandoned containers.

- To protect human health and the environment the DNR used $3.5 million in State Environmental Fund dollars to initiate or continue environmental cleanup actions at over 60 sites where groundwater contamination is known or suspected and the responsible party is unknown, unable or unwilling to conduct environmental restoration.
- The DNR, in a Wisconsin's Urban Reinvestment Initiative partnership with the city of Milwaukee and the 30th Street Industrial Corridor Corporation, initiated work on redevelopment of this economically and environmentally distressed area of the state. A focus area was selected and within it 14 Phase I Environmental Site Assessments have been completed. Sampling has taken place on two properties for completion of Phase II reports.

3. *Nutrient management plans* - DATCP, through its land and water resource management program, provides funding, primarily to counties to assist in the protection of water resources through farmer adoption of nutrient management planning. In FY 06 approximately $90,000 was provided to develop tools for nutrient management plans on farms to maximize profitability and to minimize excessive runoff of nutrients to surface and groundwater. Additionally, $520,000 was budgeted and allocated in FY 06 to provide cost-sharing to write nutrient management plans. Staff also worked to train farmers, consultants, and local agencies on the principles of sound nutrient management and how to comply with performance standards.

4. *New wellhead protection plans*. In FY 06, 11 communities received DNR approval of required WHP plans (for new wells) and 22 communities submitted voluntary plans to the DNR. In addition, WRWA completed Source Water Protection Plans for 3 geographic areas (with multiple public water systems). There are now nearly 300 communities who have a WHP plan for at least one of their wells.

5. *Groundwater project reports online* - The UW Water Resources Library disseminates the results of more than 120 groundwater research projects funded since 1989 by UWS, DNR, DATCP and the Department of Commerce through its Web site devoted to the Wisconsin Groundwater Research and Monitoring Program at *http://www.wri.wisc.edu/wgrmp/wgrmp.htm*. During the past year, the Water Resources Library partnered with UW Libraries' Digital Collections Center to digitize and put online most WRI and selected DNR final project reports. The WRI Groundwater Research and Monitoring Program Web site now links to the full-text reports, which are included in the University of Wisconsin Ecology and Natural Resources Digital Collection at *http://digital.library.wisc.edu/1711.dl/EcoNatRes.Groundwater*. Inclusion in the UW Ecology and Natural Resources online collection should make a wider audience aware of this important groundwater research.

CONDITION OF THE GROUNDWATER RESOURCE

Major groundwater quality and quantity concerns in Wisconsin include:

1. *Volatile Organic Compounds (VOCs):* Sources of VOCs in Wisconsin's groundwater include landfills, underground storage tanks, and hazardous substance spills. Thousands of wells have

been sampled for VOCs. Fifty-nine different VOCs have been found in Wisconsin groundwater. Trichloroethylene is the VOC found most often in Wisconsin's groundwater.

2. *Pesticides*: Pesticide contamination in groundwater results from field applications, pesticide spills, misuse, or improper storage and disposal. The most commonly detected pesticides in Wisconsin groundwater are: metabolites of alachlor (Lasso) and metolachlor (Dual); atrazine and its metabolites; metribuzin (Sencor); and a metabolite of cyanazine (Bladex). DATCP databases show that about 40% of private wells tested have atrazine detections, while about 1% have atrazine over the groundwater enforcement standard of 3 µg/L. A recent DATCP survey of 336 private drinking water supplies showed that 38% of wells contain a detectable level of a herbicide or herbicide metabolite.

3. *Nitrate*: Nitrate-nitrogen is the most common contaminant found in Wisconsin's groundwater. Nitrate can enter groundwater and surface water from a variety of sources including farm fields, animal feedlots, septic tanks, urban storm water, and decaying vegetation. Concentrations of nitrate in private water supplies frequently exceed the state drinking water standard of 10 mg/L. In 2005, DNR aggregated and analyzed data from three extensive statewide groundwater databases. This combined dataset from DNR's Groundwater Retrieval Network (GRN) database, the Center for Watershed Science and Education database and DATCP's groundwater database, includes only the most recent nitrate result for each sampled private well. Out of the 48,818 samples, 5686 (11.6 %) equaled or exceeded the 10 mg/L standard. Further analysis of this data continued throughout FY 06 and will continue in FY 07.

4. *Microbial agents*: Microbiological contamination often occurs in areas where the depth to groundwater or the depth of soil cover is shallow, or in areas of fractured bedrock. Microbial agents include bacteria, viruses, and parasites. These agents can cause acute illness and result in life-threatening conditions for some population groups. In one assessment, approximately 23% of private well water samples statewide tested positive for total coliform bacteria, an indicator species of other biological agents. Approximately 3% tested positive for *E. coli*, an indicator of water borne disease that originates in the mammalian intestinal tract. Viruses are increasingly becoming a concern as new analytical techniques have detected viral material in private wells and public water supplies.

5. *Radionuclides*: Naturally-occurring radionuclides, including uranium, radium, and radon are becoming an increasing concern for groundwater quality, particularly in the Cambro-Ordovician aquifer system in eastern Wisconsin. The water produced from this aquifer often contains combined radium activities in excess of 5 pCi/L, in some cases in excess of 30 pCi/L. Approximatly 60 public water systems exceed the drinking water standard of 15 pCi/L for gross alpha activity. New federal standards are causing many communities to search for alternative water supplies.

6. *Arsenic*: Naturally occurring arsenic has been detected in wells throughout Wisconsin. DNR historic data show that 3,830 public wells and 3,013 private wells have detectable levels of arsenic. About 10% of these wells exceed the new Federal drinking water standard of 10 µg/L. The highest concentration of arsenic detected in a private well in Wisconsin is 15,000 µg/L. Arsenic has been detected in well water samples in every county in Wisconsin. However, the problem is especially prevalent in northeastern Wisconsin where increased water use has likely mobilized arsenic into the groundwater. The State continues to proactively address arsenic concerns through well drilling advisories, health studies, well testing campaigns, and studies aimed at improving geological understanding and developing

practical treatment technologies.

7. *Groundwater quantity*. Despite a general abundance of groundwater in Wisconsin, there is a concern about the overall availability of good quality groundwater for municipal, industrial, agricultural, and domestic use and for adequate baseflow to our lakes, streams, and wetlands. Groundwater use grew from 570 to 804 million gallons per day (Mgal/d) from 1985 to 2000. Groundwater quantity problems have occurred both naturally and from human activities, and often affect groundwater quality. Regional effects of groundwater withdrawals are well documented in the Lower Fox River Valley, southeastern Wisconsin, and Dane County. Localized effects of groundwater pumping on trout streams, springs, and wetlands have been noted throughout the state. Groundwater quantity legislation enacted in 2004 was the first step towards managing groundwater quantity on a comprehensive basis. The DNR began to implement the provisions of the new law in FY 06.

BENEFITS OF MONITORING AND RESEARCH PROJECTS

The GCC provides consistency and coordination among state agencies in funding groundwater monitoring and research to meet state agency needs. Approximately $13.3 million has been spent by DNR, UWS, DATCP, and Commerce through FY 06 on 336 different projects dealing with groundwater or related topics. While the application of the results is wide and difficult to document, this report describes topic areas where the results of state-funded groundwater research and monitoring projects have been successfully applied to groundwater problems in Wisconsin. These areas include:

- Pharmaceuticals and personal care products
- The Atrazine Rule
- Groundwater monitoring at solid waste disposal sites
- Arsenic monitoring and research in Northeastern Wisconsin
- Groundwater movement in fractured dolomite
- Developing new tools for groundwater protection
- Prevention and remediation of groundwater contamination
- Detection and monitoring of microbiological contaminants
- Groundwater drawdown
- Comprehensive planning
- Microbiological groundwater monitoring
- Rain garden design & evaluation
- Methylmercury formed in groundwater
- Estrogenic endocrine disruptors in groundwater

FUTURE DIRECTIONS FOR GROUNDWATER PROTECTION

The GCC recommends the following priorities for future groundwater protection and management:

1. **Restore adequate funding for groundwater monitoring and research**: State budget cuts have limited the number and scope of groundwater research and monitoring projects that were funded in the recent years (see Table 3 in Chapter 2). Cuts continue to hamper the State's ability to address critical groundwater monitoring and research needs in the future. Most of these research and monitoring needs are targeted at identifying strategies to prevent subsurface problems and their costly remediation and thus result in a net savings for the State.

The GCC encourages its member agencies and the Legislature to restore adequate resources for groundwater monitoring and research and to seek partnerships to leverage additional funds.

2. **Acute and chronic impacts to groundwater from manure management:** Groundwater contamination resulting from manure disposal has been an increasing problem in recent years for private well owners. A statewide assessment is needed to understand the scope and magnitude of the problem. Mechanisms, pathways, and timing of movement into groundwater, the influence of landscape settings and climatic factors, the applicability of new analytical tools and methods of vulnerability assessment and best management practices (BMPs) and the threat of associated contaminants (bacteria, nitrates, pharmaceuticals, viruses, other pathogens, etc. all need to be understood better to address the problem.

3. **Address groundwater quantity management issues at both statewide and regional levels:** Groundwater quantity issues came to the forefront of public discussion in FY 04, with the development and passage of landmark groundwater quantity legislation, 2003 Wisconsin Act 310. This legislation has the potential to address needs identified by two recent forums, the 2001 Groundwater Summit and the 2003 Waters of Wisconsin Initiative. Common themes included the need for a statewide management plan for water quantity, water conservation, high capacity well reform, reevaluation of water pricing structures and regional approaches to water quantity issues. The GCC will continue to serve as a resource for addressing scientific and technical questions related to groundwater quantity and facilitate further dialogue among all parties on potential approaches and solutions.

4. **Support implementation of a Statewide Groundwater Monitoring Strategy:** Chapter 160 of the Wisconsin Statutes requires the DNR to work with other agencies and GCC to develop and operate a system for monitoring and sampling groundwater to determine whether harmful substances are present. In 2004, several agencies worked together to develop a Statewide Groundwater Monitoring Strategy to guide agency monitoring efforts for the next ten years to address both groundwater quality and quantity needs. This strategy recognizes the importance of long-term data collection to be able to make informed decisions based on science. The GCC encourages agencies, the university, and federal and local partners to implement the various components of the strategy and to seek funding to support its implementation.

5. **Coordinate and facilitate consistent messages on groundwater related issues:** The public has benefited from the consistent educational messages that have been endorsed by the GCC. In FY 05, the Subcommittee launched a "Groundwater Information Network" with non-governmental organizations to further its mission of promoting consistent messages regarding groundwater protection and building a groundwater constituency. The GCC will continue to use this network and other means to promote water stewardship and awareness of water quantity issues, find innovative ways to encourage testing of private water supplies, and provide materials for local communities to support comprehensive planning activities.